

IN THE CLAIMS

The listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims

1. (Currently Amended) A method for modulating the morphology of softwood fibers comprising the steps of:
subjecting pulp containing softwood fibers to a solution containing ferrous (II) or ferric (III) metal ions at a concentration of from 0.002% to about 0.1% by weight based on pulp and a peroxide at a pH between about 2 and about 7 for a time of from about 10 minutes to about 10 hours at a temperature from about 40 to 120°C to cause oxidative degradation of cellulose of such softwood fibers, and
subjecting the treated fibers to a refining treatment to form refined paper making fibers which exhibit a substantially shorter fiber length and distribution and enhanced fiber collapsibility compared to the unrefined paper making fibers, wherein said method reduces fiber suspension viscosity after said refining treatment.
2. (Canceled).
3. (Previously Presented) The method of Claim 1 wherein ferrous chloride, ferrous sulfate, or ferric chloride are a source of said ferrous (II) or ferric (III) metal ions.
4. (Original) The method of Claim 1 wherein said pH is between about 3 and about 7.
- 5-6. (Canceled).
7. (Previously Presented) The method of Claim 1 wherein said peroxide is present in said solution at a concentration between about 0.2% and about 5% based on pulp.
8. (Canceled).

9. (Previously Presented) The method of Claim 1 wherein said softwood fibers are subjected to said solution for a time sufficient to substantially act on at least the cellulose and hemicellulose of the pulp, causing oxidation and oxidative degradation of cellulose fibers.

10-19. (Canceled).

20. (Previously Presented) The method of claim 1 wherein said softwood fibers are Kraft fibers.

21. (Previously Presented) The method of claim 1 wherein said softwood fibers are Southern Pine fibers.

22. (Previously Presented) The method of claim 1 wherein said softwood fibers are bleached fibers.

23. (Previously Presented) The method of claim 1 wherein said softwood fibers are bleached Kraft fibers.

24. (Cancelled) The method of claim 1 wherein said refined paper making fibers exhibit a substantially shorter fiber length and distribution and enhanced fiber collapsibility than prior to said refining treatment.

25. (Previously Presented) The method of claim 1 wherein said refined paper making fibers exhibit paper making properties substantially functionally equivalent to hardwood pulp papermaking properties.

26. (Previously Presented) The method of claim 1 wherein said subjecting step comprises treating said pulp containing softwood fibers with said composition comprising peroxide and ferrous (II) and ferric (III) metal ions.
27. (Previously Presented) The method of claim 4 wherein ferrous chloride, ferrous sulfate, or ferric chloride are a source of said ferrous (II) or ferric (III) metal ions.
28. (Previously Presented) The method of Claim 1, wherein said pH is between about 3 + and about 7.
29. (Previously Presented) The method according to Claim 1, further comprising adding a source of ferrous (II) or ferric (III) metal ions to said peroxide.
30. (Previously Presented) The method according to Claim 29, further comprising:
adding a source of ferrous (II) or ferric (III) metal ions ~~ion~~ to said peroxide in the presence of the pulp.
31. (Previously Presented) The method according to Claim 30, further comprising:
adding between 0.002% and about 0.1% of ferrous (II) or ferric (III) ions based on pulp to said peroxide in the presence of the pulp.
32. (Previously Presented) The method according to Claim 29, further comprising:
adding between 0.002% and about 0.1% of ferrous (II) or ferric (III) metal ions based on pulp.
33. (Cancelled).

34. (Previously Presented) A method for modulating the morphology of softwood fibers, comprising:

adding ferrous (II) or ferric (III) metal ions at a concentration of from 0.002% to about 0.1% by weight based on pulp to a solution comprising peroxide to form a metal-ion activated peroxide;

contacting pulp including softwood fibers with the metal ion-activated peroxide at a pH between about 2 and about 7 for a time of from about 10 minutes to about 10 hours at a temperature from about 40 to 120°C to cause oxidative degradation of cellulose of such softwood fibers, and

refining the treated fibers to form fibers having a modified morphology which exhibit a substantially shorter fiber length and distribution and enhanced fiber collapsibility compared to the unrefined fibers, wherein said method reduces fiber suspension viscosity after said refining treatment.

35. (Canceled).

36. (Previously Presented) The method according to Claim 34, wherein ferrous chloride, ferrous sulfate, or ferric chloride are a source of the ferrous (II) or ferric (III) metal ions.

37. (Canceled).

38. (Currently Amended) The method according to Claim 34, wherein said pH is between about 3 and about 7.

39. (Previously Presented) The method according to Claim 1, wherein said pulp further comprises hardwood fibers.

40. (Cancelled).

41. (Previously Presented) The method according to Claim 34, wherein said pulp comprises between about 50% and about 90% softwood fibers and between about 10% and about 50% hardwood fibers.